

**What is trichloroethylene (TCE)?**

Trichloroethylene (TCE) is a colorless, nonflammable liquid with a characteristic chloroform-like odor. It is practically insoluble in water and evaporates quickly. The most common use of trichloroethylene is the degreasing of metal parts in the automotive and metal industries. TCE is used in many consumer products, including typewriter correction fluids, paint removers, paint strippers, adhesives, spot removers, cleaning fluids for rugs, and metal cleaners.

**Who is exposed to TCE?**

Most exposures to trichloroethylene occur in the workplace through breathing vapors or direct contact with the liquid. Exposure of the general public occurs mainly through breathing industrial emissions, drinking, swimming, or showering in water that has been contaminated, or using consumer products containing trichloroethylene. Low levels of TCE ranging from 0.25 to 0.31 parts per billion (ppb) have been detected in many drinking water samples throughout the United States. TCE has been detected in small concentrations in many processed foods as a result of its use in cleaning equipment

**How can TCE affect my health?**

Inhaling TCE vapors at very high concentrations may cause irregular heartbeat, heart functions failure, unconsciousness, and death. Inhaling moderate amounts in the air may cause headaches, dizziness, poor coordination, difficulty concentrating, facial numbness, and lung irritation. Consumption of alcohol and exposure to trichloroethylene at the same time can result in "degreaser's flush," a temporary redness and itching of the back, neck, and face. Long term exposures at high concentrations may cause liver and kidney damage and changes in heartbeat. Skin contact with trichloroethylene can cause skin rashes.

**How likely is TCE to cause cancer?**

The National Toxicology Program (NTP) has determined that trichloroethylene is a known human carcinogen. The U.S. Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (IARC) have determined that trichloroethylene is carcinogenic to humans. Based on data from animal studies and theoretical models, it is estimated that a lifetime exposure to drinking water containing trichloroethylene at 5 ppb may increase the risk of two additional cases of cancer in a population of one million people.

**How can TCE affect children?**

No increased incidence of congenital malformations has been detected in babies born to mothers occupationally exposed to TCE. Although TCE has the ability to cross the placenta and possibly expose the fetus, fetal toxicity has not been observed in experimental animals. There are some reports of an increased number of children born with heart defects whose mothers consumed water contaminated with TCE for several years. However, these studies are not conclusive because other chemicals were also present in the water and may have contributed to these effects. Also, the levels of trichloroethylene in water were very high.

## **Is there a medical test to show whether I have been exposed to TCE?**

There are some tests that can show if a person has been exposed to high levels of TCE within the past 24 hours. Blood and urine tests can also show the breakdown products of TCE. However, these breakdown products cannot be measured in the blood or urine when people have been exposed to low levels of trichloroethylene over a long period of time. Exposure to other similar chemicals can also produce the same breakdown products. Therefore, their detection is not absolute proof of exposure to trichloroethylene.

## **How can I reduce the risk of exposure to TCE?**

Avoid drinking water contaminated with TCE. The Virginia Department of Health (VDH) recommends installing a whole-house charcoal filtration device to remove trichloroethylene contamination from drinking water. Prevent children from playing in dirt or eating dirt if you live near a waste site that has TCE. If you use products that contain TCE, follow instructions on the product labels to minimize exposure.

## **Has the federal government made recommendations to protect human health?**

The Occupational Safety and Health Administration (OSHA) has established the permissible exposure limit (PEL) of 100 parts per million (ppm) trichloroethylene in workplace air. This limit is based on an eight-hour time-weighted average for a 40-hour workweek. A short-term exposure limit (STEL) has been established at 200 ppm for a 15-minute exposure.

EPA sets the standards for public drinking water. These standards or limits are known as Maximum Contaminant Levels or MCLs. EPA has set an MCL of 5 ppb in the public drinking water supply for trichloroethylene. This standard was derived based on its classification as a probable human carcinogen and based on the assumption that a person drinks 2 liters of water per day for 70 years.

## **Where can I get more information on TCE?**

- If you have concerns about trichloroethylene, contact your healthcare provider.
- Call your local health department. A directory of local health departments is located at <http://www.vdh.virginia.gov/local-health-districts/>. Contact the Virginia Department of Health at (804) 864-8127 or at [toxicology@vdh.virginia.gov](mailto:toxicology@vdh.virginia.gov).
- Visit the Agency for Toxic Substances and Disease Registry website at <https://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=30>.

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